

## CHAPTER III: FIRST OHIO RIVER NAVIGATION IMPROVEMENTS

The extent of the powers of the government of the United States has been a controversial issue since the origins of the republic. The national debates over the constitutional questions involved have had lasting effects on the American political system, on the economic and social development of the republic, and on many other aspects of American life. The constitutionality of federally funded and supervised projects for internal improvement, or civil works, which encompassed the improvement of waterways navigation, was a political issue to which Congress devoted much of its time prior to the Civil War. Disagreement over constitutional issues prevented any improvement of navigation on American inland rivers until 1824, though a few seaport harbors were improved and federal funds were provided in a few instances for construction of road and canal projects. The consequences which this political controversy had for inland waterways navigation may be illustrated by the fact that between 1789 and 1861 more federal funds were appropriated for the construction of sea-coast lighthouses than for the improvement of navigation on the inland rivers.<sup>1</sup>

During Congressional debates over constitutional issues, proponents of the improvement of waterways navigation sought to make a distinction between waterways projects and internal improvements in general, arguing that navigable waterways were under national rather than state jurisdiction. Opponents of internal improvements, on the other hand, were prone to include waterways projects as part of what they considered an unconstitutional program for internal improvements. In 1824 federal courts declared that navigable waterways were de-

finitely under federal jurisdiction, and the opposition to internal improvements and waterways improvement projects was temporarily overcome in Congress. As a result, an extensive system of federal aid to internal improvements — roads and canals — in conjunction with navigation improvement projects was initiated in 1824.

The Corps of Engineers organization was selected for the task of implementing the civil works program authorized by Congress in 1824, and this program included the first federal project for the improvement of navigation on the Ohio River. During the course of the first experiments with waterways improvement methods on the Ohio, the Corps of Engineers learned some important lessons which were to be of significant value to its subsequent projects for enhancing navigation on the inland rivers — lessons which were to have wide application throughout the United States.

*Federal Civil Works Policies, 1789-1812*

The first President of the United States was an ardent proponent of improved waterways navigation and of projects planned to unite the commerce of the Ohio Valley with that of the Atlantic states. George Washington wrote in 1786 that he was pleased by support for the improvement of inland navigation then prevailing. He declared: "No country is more capable of improvements in this way than our own, none which will be more benefited by them . . . ." <sup>2</sup> Washington was personally active in a number of private and state projects for the improvement of navigation and transportation facilities; but the limited resources of private corpo-

rations and state governments prior to 1800 prevented the completion of many beneficial projects. The only projects of benefit to navigation undertaken by the federal government during the Washington administration were the installation of lighthouses, beacons, and buoys along the seacoasts. The same was true of the administration of John Adams, except that on the eve of the end of his term of office President Adams signed a bill which provided funds for the construction of public piers in the Delaware River at Philadelphia.<sup>3</sup>

During the administration of Thomas Jefferson, 1801-1809, public lands were granted to state governments to finance a few internal improvement projects, the construction of the National, or Cumberland, Road from Maryland to the Ohio Valley was authorized, and in 1807 Secretary of Treasury Albert Gallatin conducted a study of American transportation needs. In his report of 1808 to Congress, Secretary Gallatin declared the improvement of transportation in the United States was important for commercial reasons and also was vital to the defense of the nation and its territories. He recommended the construction, with twenty million dollars of federal funds, of a north-south canal and road system across the Atlantic states from Maine to Georgia and the development of four transportation routes across the Appalachian mountain chain into the Ohio Valley. But his report was completed shortly after foreign complications had led to the Embargo Act and Congress did not act upon it. Though Congressman Peter Porter of western New York state and Senator John Pope of Kentucky sponsored bills in 1810 which would have authorized construction of portions of transportation system outlined in the Gallatin Report, Congress did not enact them.<sup>4</sup>

### *The War of 1812 and Federal Waterways Policies*

The events of the War of 1812 convinced many American political leaders that improved waterways and transportation facilities were necessary for the proper defense of the United States. The use of the inland rivers to transport troops and munitions from the Ohio Valley to defend New Orleans in 1815 provided proponents of improved waterways navigation with an eloquent argument for federal action. Inadequate transportation facilities had also contributed to the very high prices paid by the government for supplies and munitions furnished troops on the frontiers. A summary of these arguments were printed in an editorial in the Louisville *Public Advertiser* in 1822, which read in part:

The improvement of the Ohio, from this place to its junction with the Mississippi, is demanded, not only on account of its being the principal outlet for the produce of several flourishing states, but by national considerations. New Orleans must always look to the interior for a force competent and willing to defend her in the event of war. Hence, an armory at this point, and the removal of obstructions in the river below, are essential both to the public interest and the national safety.<sup>5</sup>

A Board of Fortifications, consisting of two Army Engineers and a naval officer, was appointed in 1816 to study the defense of the United States in the light of the experience of the War of 1812, and it reported that the proper defense of the nation rested on four pillars — a strong navy, adequate coastal fortifications, a regular army and organized militia, and improved transportation routes in the interior to permit rapid concentration of the armed forces. Captain William Tell Poussin, secretary to the Board of Fortifications, later explained the fourth recommendation: "While every improvement in the chan-

nels of communication has . . . a direct relation to the national defense, it especially tends to develop the agricultural industry of the country, the fundamental basis of public prosperity, and to consolidate the internal peace of the citizen.”<sup>6</sup>

John C. Calhoun, who as a member of Congress in 1817 had engineered the enactment of a bill to initiate construction of projects recommended in the Gallatin Report of 1808 only to see it vetoed by President James Madison for constitutional reasons, became Secretary of War to President James Monroe. In response to a resolution of the House of April 4, 1818, Secretary Calhoun, with the aid of the Board of Fortifications, studied the question of transportation routes in the interior. He reported in 1819 that federal aid to transportation would have multiple civil and military benefits, for, he said; “It is in a state of war, when a nation is compelled to put all of its resources in men, money, skill, and devotion to country into requisition, that its Government realizes in its security the beneficial effects from a people made prosperous and happy by a wise direction of its resources in peace.”<sup>7</sup> The reasoning that the improvement of transportation facilities would have both civil and military benefits explains, in part, the assignment of the Corps of Engineers, United States Army, to the supervision of such improvement projects in 1824.

### *State Survey of the Upper Ohio*

While Congress was debating the constitutional questions surrounding the issue of improved waterways and transportation facilities, the steamboat boom which began in the post-War of 1812 era in the Ohio Valley engendered such great support for the improvement of navigation on the Ohio River that state governments in the region took joint action without fed-

eral aid. The extended low-water seasons on the Ohio River in 1818, 1819, and 1820 had catastrophic effects on business affairs in the valley. Over three million dollars worth of merchandise and hundreds of travelers and immigrants were held up for months in 1818 at Ohio River ports while waiting for a rise in the river. There was no fall rise at all in 1819, and navigation on the Ohio was suspended from April, 1819, to February, 1820. A visitor to the Ohio Valley in 1819 mentioned about a hundred steamboats were on the river, but not one had been running for more than six months, with ruinous effects on both navigation interests and commerce in general.<sup>8</sup>

On January 27, 1817, the state of Ohio invited the states of Kentucky, Virginia, Indiana, and Pennsylvania to appoint representatives to a joint commission authorized to devise plans for the improvement of the Ohio River from Pittsburgh to Louisville. All except Indiana accepted, and the Joint Commission met at Pittsburgh on August 1, 1819, to begin its examination of the Upper Ohio River. Members of the Commission were Samuel Blackburn of Virginia, Edward Tupper of Ohio, Walter Lowrie of Pennsylvania; John Adair of Kentucky was the fourth member, but he did not join the survey party until it reached the Falls of the Ohio. The Commissioners appointed Magnus M. Murray as surveyor, purchased the necessary equipment, hired boatmen and laborers, and set off down the river. One hundred two maps of the worst obstructions on the river were made during the five-week survey. At Louisville, in early October, the Commission was met by a committee of citizens who furnished the Commission with studies and maps of the Falls of the Ohio; and at Gallipolis, Ohio, on November 2, 1819,

the Commission completed its report. The Commissioners did not believe any precise calculation of a benefit-cost ratio for the project of improving navigation on the Ohio River was necessary:

The Commissioners deem it superfluous to offer any arguments to show the advantages that would result from the improvement of the navigation of this noble stream. Were any wanted it would only be necessary to allude to the loss of property occasioned by the wreck of descending boats, to the painful spectacle of steamboats, barges and even vessels of less burden locked up for the want of a sufficient depth of water, many of them lying on the bars, none of them in a good state of preservation, and numbers going rapidly to decay, whilst through a fertile and populous region of 1000 miles in extent, the commerce and interchange of domestic commodities are completely embargoed.<sup>9</sup>

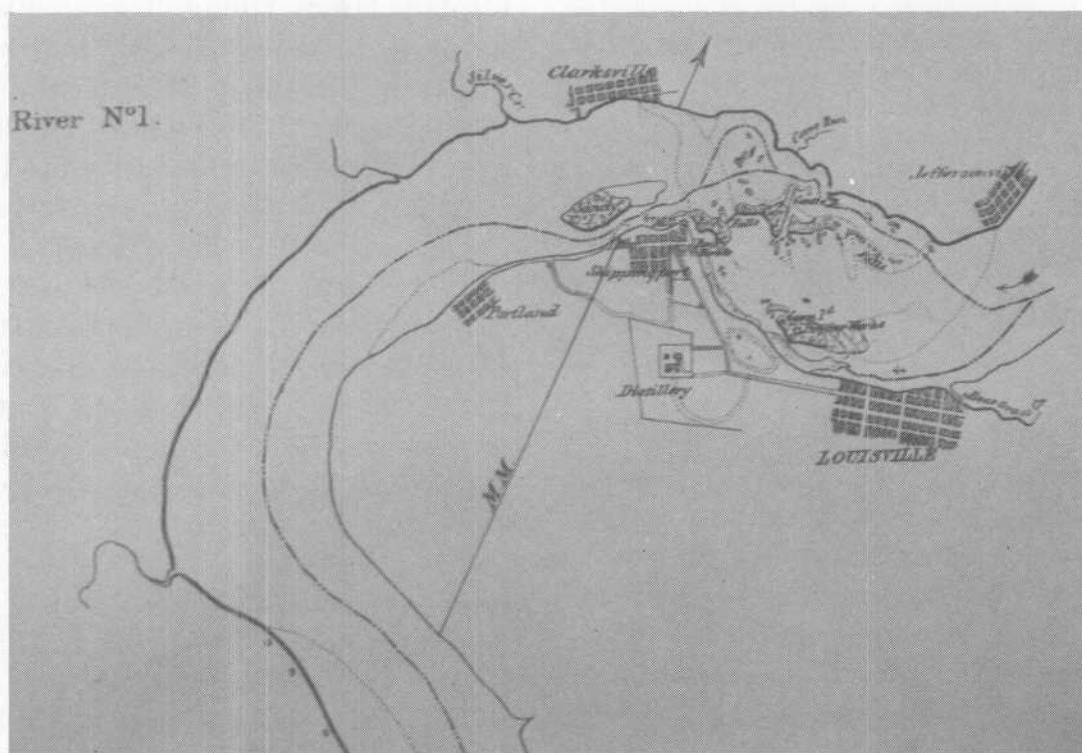
The Commission recommended the construction of a canal around the Falls of the Ohio along the Kentucky bank and the appropriation of ten thousand dollars by each of the four participating states for the general improvement of navigation on the Ohio. John Adair, shortly after completion of the survey and report, became Governor of Kentucky, and in a message to the Kentucky legislature in 1820 he urged the participation of the state in joint efforts to improve Ohio River navigation, arguing that the project could be completed in a season and that its expense would be more than repaid at every succeeding navigable stage. No action was taken by Kentucky, however, nor by Virginia and Ohio, except to appeal to Congress for federal improvement of the river. Pennsylvania, however, appropriated \$15,000 and in the early 1820s cleared the Ohio of the worst obstructions between Pittsburgh and Wheeling, the terminus of the National Road, to open navigation to keel and flat-boat traffic at low-water stages.<sup>10</sup>

### *Federal Survey of the Lower Ohio*

On April 14, 1820, Congress appropriated \$5,000 to continue the survey initiated by the states in 1819 of navigation problems on the Ohio and Mississippi rivers. The mission of completing the survey from Louisville to New Orleans was assigned by the President to the Board of Engineers for Fortifications; and in 1821 Captain Hugh Young, Topographical Engineers, boarded the U. S. Steamboat *Western Engineer* at Smithland, Kentucky, on the Lower Ohio and took it to Louisville. There, he was joined in early October by General Simon Bernard, Colonel Joseph G. Totten, Captain William Tell Poussin, and Lieutenant Stephen Tuttle. General Bernard had served as Engineer to Napoleon Bonaparte, had immigrated to the United States after Waterloo with a recommendation from Lafayette, and had been appointed Brigadier General in the Corps of Engineers; he returned to France in 1831 to become Chief of French Army Engineers and Minister of War. Colonel Totten served in the Corps from 1805 to 1864, twenty-six of those years as Chief Engineer of the Corps. Captain Poussin, whose travels in the Ohio Valley have been previously mentioned, also came to the United States from France and joined the Corps; like General Bernard, he returned to France and later became Ambassador to the United States from France and wrote several histories of the United States and its transportation system.<sup>11</sup>

The Louisville *Public Advertiser* printed a lengthy editorial concerning the arrival of these officers at the Falls City and their mission, which read in part:

We are gratified that our two great western rivers, and the extensive and populous country through which they flow, have attracted the attention of the government. This survey is to be made



1821 Survey of Ohio River below the Falls of Louisville, Kentucky by the Corps of Engineers — General S. Bernard, Captain W. T. Poussin, Colonel J. Totten and others.

with a view to the improvement of their navigation, and we have now every reason to believe that, the west, if its representation unite on the subject, will soon feel the good effects resulting from at least a partial participation in the public expenditures.

The contemplated improvement of the two principal rivers in the west, so as to render them navigable at all seasons must be an undertaking of the first magnitude to the government and people. It will greatly facilitate the passage of our produce to market at the most important season of the year, while the government will be able at any time, in case of the future invasion of New Orleans, to send men, arms and ammunition in time to defend it. We view the proposed improvement, as one of far higher interest than that by which New-York is immortalizing herself [Erie Canal], as the whole population of the great valley between the Allegheny and Rocky Mountains will be benefitted by its consummation . . . .<sup>12</sup>

The Board of Engineers departed Louisville on October 16 to perform the survey; they arrived at New Orleans at the end of the year, inspected harbors and seacoast fortifications along the Gulf of Mexico, and returned to headquarters to complete their reports and maps. The Board mapped the twenty-one worst obstructions to navigation on the Lower Ohio and recommended projects for their improvement. The methods suggested to accomplish the proposed improvements included a canal around the Falls of the Ohio, the removal of snags and projecting boulders, and the construction of experimental wing-dams, or longitudinal spur dikes, to contract the river channel at shoals. Their report became the basis for subsequent Congressional authorization in 1824 of a project for improving the Ohio.<sup>13</sup>

#### *First "Rivers and Harbors Act," 1824*

From 1815 to 1824, increased public support for the construction of roads and canals and the improvement of waterways was evident. Much of this support came from the Ohio Valley and the West, where

the need of a growing population for better transportation and marketing facilities was acute. Citizens of the Ohio Valley eagerly sought federal aid for the improvement of transportation, and, through their increased representation in Congress, made their wishes known. Westerners were especially bitter about the continued neglect of the improvement of inland rivers as compared with the continued funding provided for harbor improvements and lighthouse construction along the seacoasts. The editor of the Louisville *Public Advertiser* complained about this disparity in 1821:

If we ask the aid of the nation in removing an obstruction, to the navigation of a river, penetrating to the centre of the Union, and forming the only out-let to the produce of several powerful states, our supplications are to be treated with contempt; until our Atlantic shore presents a chain of battlements and towers — till every port, bay and in-let is ornamented with a light-house . . . .<sup>14</sup>

One congressman described the Eighteenth Congress, 1823-1825, as constituting a "new era in our politics" because it represented millions of men from frontier states who had exercised their political rights for the first time. The Eighteenth Congress did give increased attention to the needs of the West, particularly to its transportation problems. Congressman Henry Clay of Kentucky, as Speaker of the House during the Eighteenth Congress, led the Western bloc in Congress in efforts to provide appropriations for internal and waterways improvement projects. He was strongly supported by Congressmen Robert P. Henry and Charles A. Wickliffe of Kentucky in the House, while in the Senate the proponents of federal civil works were led by Senator Richard M. Johnson of Kentucky.<sup>15</sup>

The opposition to the Clay "American System" came principally from eastern

states, whose representatives maintained that both federal aid to canal and road construction and federal improvement of inland river navigation were unconstitutional extensions of federal powers. Congressman Charles A. Wickliffe, in explaining to his constituents the nature of the controversy, claimed that the opposition believed, or pretended to believe, that federal aid to commerce was limited to the tidewater, that improvement of inland river navigation was a violation of state sovereignty.<sup>16</sup>

In the Congressional debates over the constitutionality of waterways improvements, Henry Clay often reminded the House that the report of the Board of Engineers demonstrated that improvement of navigation on the Ohio and Mississippi rivers was feasible, and he pointed out that the two rivers were the boundaries of several states, the "common commercial highway of all," and therefore were national property. The improvement of their navigation, Clay argued, should be a question of methods and expediency, not of constitutionality. Congressman Robert P. Henry told the House that if the work were not undertaken by the federal government, it would be undertaken jointly by a regional compact of the states; and he warned Congress that such a confederacy, devoted to the furtherance of its own special interests, might be a serious threat to the Union. These men prevailed in the Eighteenth Congress and their leadership led to the enactment of landmark legislation.<sup>17</sup>

On April 30, 1824, President James Monroe signed the General Survey Act, which authorized the President to assign Army Engineers to surveys of roads and canal which were important to national commerce, defense, and transportation of the mails. And on May 24, he signed the

first "Rivers and Harbors Act," which made an appropriation of \$75,000 for the improvement of the Ohio and Mississippi rivers. The Act listed six bars in the Ohio River below the Falls and directed that experiments be conducted to determine the best method of improvement at those localities; it directed "prompt and effectual" steps be taken to remove "planters, sawyers, or snags" which might, at the *lowest stage* of the water, endanger traffic on the Ohio and Mississippi rivers.<sup>18</sup>

Secretary of War John C. Calhoun urged that the Army Engineers be assigned to the work authorized by the General Survey Act and Rivers and Harbors Act of 1824, contending the work would keep the Engineers fit and trained for war in time of peace and secure greater efficiency in the construction of the projects. Henry Clay agreed with the Secretary and arranged the amendment of both acts to provide for the utilization of the services of the Army Engineers. To supervise and perform surveys under the General Survey Act, the Secretary of War appointed a Board of Internal Improvements, consisting of General Simon Bernard, Colonel Joseph Totten, and John L. Sullivan, a distinguished civil engineer, with Captain William Tell Poussin as recording secretary. This board functioned until 1831, performing scores of road and canal surveys and participating in the planning of the first railroads constructed in the United States.<sup>19</sup>

The implementation of the provisions of the Rivers and Harbors Act was assigned to General Alexander Macomb, Chief Engineer of the Army (1821-1828; appointed General-in-Chief of the Army in 1828). It will be recalled that General Macomb had navigated the Ohio in a flatboat with Major Jonathan Williams in 1801. General Macomb took two "prompt" measures to





(U. S. Signal Corps Photograph)

COLONEL STEPHEN H. LONG



meet the requirements of the Act; he initiated a search for an effective method of removing snags and he dispatched Major Stephen H. Long back to the Ohio Valley to conduct experiments with wing-dam, or dike construction.

### *First Federal Improvement of Ohio River Navigation*

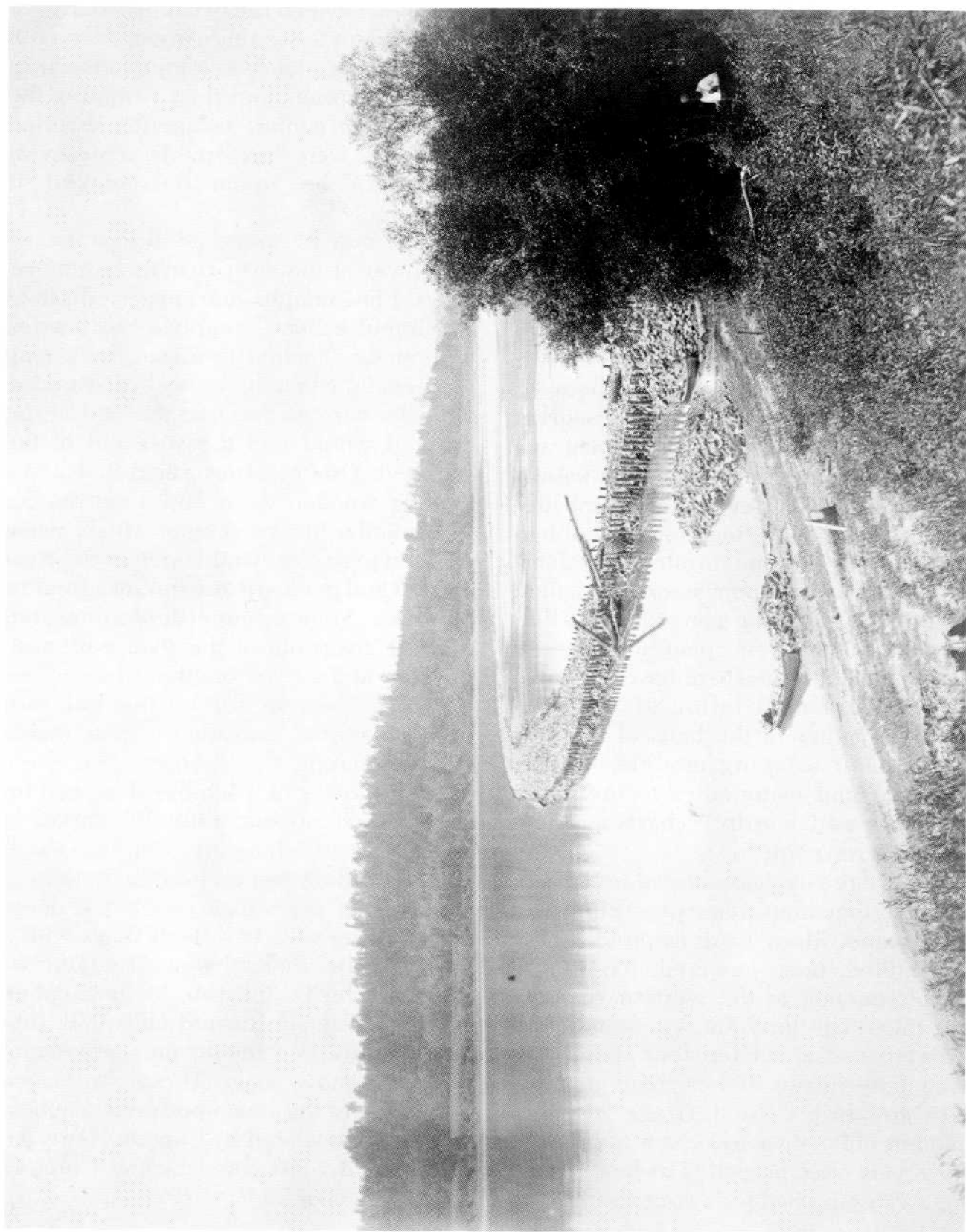
Major Long inspected the six bars in the Ohio River listed for improvement in the Rivers and Harbors Act during the summer of 1824, and he selected a gravel bar which had fifteen inches of water over it at low-water for his experiments with fluvial hydraulics. The bar was located near Henderson, Kentucky, a few miles below the mouth of the Green river and Evansville, Indiana. After extensive study of the bar, Major Long determined the best method of improvement would be to construct a wing-dam of timber piling extending from the right bank toward the river channel at a forty-five degree angle downstream. The purpose of the structure was to narrow the channel of the river, thereby increasing the volume and velocity of the water crossing the bar, and, hopefully, removing the bar through the scouring action of the river itself. Major Long employed Asa B. Shepherd, the first civilian assistant employed by the Corps of Engineers on the improvement of the inland rivers, as supervisor of a working crew, built a floating plant — mostly flatboats — constructed manually operated pile-driving machines which had five-hundred-pound weights as rams, mounted the pile-drivers on flatboats, and began the experiment.<sup>20</sup>

During the low-water seasons of 1824 and 1825, Major Long experimented with various wooden-pile dam structures, trying different lengths, different widths, dif-

ferent heights. The dam, as finally completed, was 402 yards long and consisted of a double-line of 1400 wooden piles tied together with timber stringers and filled with brush. The cost of this wing-dam, the first improvement to navigation on the Ohio River constructed by the Corps of Engineers, totaled \$3,778.93, including all expenses. Major Long left Asa Shepherd at the site to make daily inspections of the structure. Shepherd later reported the dam fully met every expectation; it concentrated the river flow sufficiently to cut away the bar and increased the navigable depth over the bar to a minimum of four feet. Sand and gravel accumulated around the dam to such an extent that it served navigation for many years — it was still functioning in 1872 when it was repaired and extended.<sup>21</sup> Until the construction of the slackwater system of locks and dams on the Ohio River, 1875-1929, this type of spur dike was the principal method used for increasing navigable depths on the Ohio. The method was still used where appropriate on the inland waterways in the mid-twentieth century.

### *Contest of 1824*

The second major provision of the Rivers and Harbors Act of 1824 authorized the acquisition of the "watercraft, machinery, implements, and force" necessary to remove planters, sawyers, and snags from the Ohio and Mississippi rivers. "Snag" was the western rivermen's name for any timber obstruction to navigation, and a traveler on the Ohio in 1817 explained: "A *Planter* is a tree rooted fast to the bottom of the river, & rotted off level with the water, a heavy boat striking one of them may be staved and sunk. *Sawyers* are trees less firmly rooted; they rise and fall with the water; if they point up the stream, they are dangerous, but not so much when they



979, Aug. 20, 1892.

OHIO RIVER, Flint Island Dike.

383 miles from Pittsburgh.

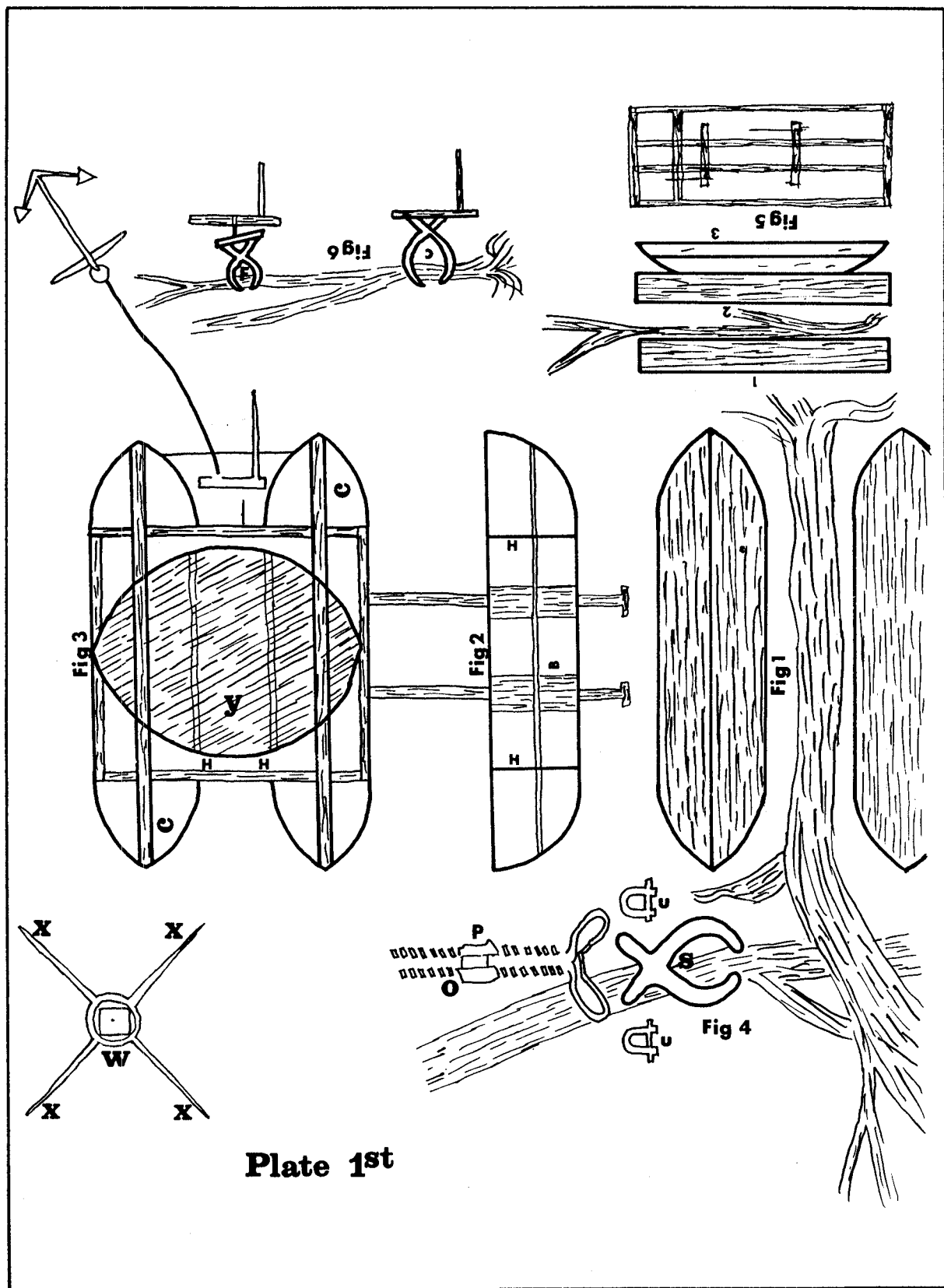
point down.” One riverman estimated in 1824 that the total number of snags in the Ohio and Mississippi rivers could not be less than 50,000, and he added: “if these were removed and kept so, the river would assume a new aspect, highly creditable to those engaged actively or passively, in the contemplated improvement.”<sup>22</sup>

Water-soaked snags, often over a hundred feet long and weighing many tons, were deeply imbedded in the river bottoms. Where exposed at low water they could be sawed off and chopped down, but in the river channel this would leave a stump, more dangerous to traffic because pilots could not see it. A powerful mechanism to extract the entire snag was needed, but no such machine was known to exist in 1824. General McComb decided to solicit solutions to the problem from the public, and printed an advertisement in newspapers across the nation in June, 1824, offering a one thousand dollar prize for the best “plan, machine, or instrument” designed to remove snags. An avalanche of mail followed and men began to gather in the halls of the War Department carrying models of their machines and testimonies to their “respectable and worthy” character from their congressmen.<sup>23</sup>

Some of the devices entered in the contest were ingenious, some promising, and some weird. Many were inspired by the twin-hulled, horse-powered, ferry-flat, a vessel common to the western rivers at that time. The ferry-flat was simply two boats spaced about ten feet apart, connected by heavy timbers, and planked over to permit the ferriage of large amounts of freight across rivers in one trip. They were often propelled by horses turning a capstan on the deck of the boat to

wind a rope tied to the opposite shore, or to turn a shaft geared to a paddlewheel mounted between the two hulls. Many entries suggested anchoring a ferry-flat below a snag, attaching a rope to the snag from the capstan, and then whipping the horses. One contest competitor asserted that horses were “preferable to Steam for they may be instantly checked if necessary.”<sup>24</sup>

Some entries proposed utilization of the power of the river current to remove snags. For example, one suggested use of an “Impulse Boat,” simply a boat loaded with stone attached to a snag by a long slack chain; when the heavy boat, running with the current, reached the end of the chain it would jerk the snag out of the riverbed. Other entries suggested using floating wooden dams and a canvas device, similar to a parachute, which, when chained to a snag, would open in the river current and gradually tug the snag from its mooring. Some competitors suggested blasting snags out of the river with gunpowder, and they submitted plans of underwater devices for boring holes in snags, inserting canisters of gunpowder, and detonating the charges. And there were a number of machines designed for subaqueous sawing. John W. Parker, a millwright of Vincennes, Indiana, suggested sending two men to the bottom of the river in rigs which resembled deep-water diving suits to saw off snags with a crosscut saw. Several trained engineers, such as John L. Sullivan, Major Stephen H. Long, Captain Richard Delafield, submitted plans for using the power of steamboats to remove snags. These plans came very close to the steam-powered snagboat eventually invented by Captain Henry M. Shreve and constructed by the Corps of Engineers in 1829.<sup>25</sup>



ENTRY OF JOHN W. PARKER IN CONTEST OF 1824 SNAG REMOVAL MACHINE. FROM NATIONAL ARCHIVES, RECORD GROUP 77. LRJ

### *The Contract of 1824*

Because the Rivers and Harbors Act of 1824 called for "prompt" action to remove snags, the Chief Engineer placed an advertisement in the newspapers, running with the request for submission of proposed devices for snag-removal, which asked for bids from contractors for removing snags from the Ohio and Mississippi rivers. It requested that proposals for removing snags from the rivers at the *lowest stage* of the water be submitted by September 1, 1824. At least twelve bids were received, but the two which received serious consideration came from Samuel McKee and John Bruce of Kentucky. Samuel McKee, an attorney and former member of Congress from Lancaster, Kentucky, was well-known nationally as one of the pre-War of 1812 "Warhawks." He and his associates offered to clear the Ohio River of snags for \$25 per mile down to Shawneetown, \$30 per mile from Shawneetown to the mouth of the river, and bid \$30, \$81, and \$100 for various sections of the Mississippi. <sup>26</sup>

John Bruce of Vanceburg (Lewis County), Kentucky, carrying with him plans of a snag-pulling machine, a proposal to contract for the removal of snags from the Ohio and Mississippi rivers, and recommendations from numerous political leaders of Kentucky, including Henry Clay, traveled to the War Department in person in August, 1824. He met with the Secretary of War and the Chief Engineer and proposed to clear the entire Ohio and the Mississippi from St. Louis to New Orleans of snags for sixty thousand dollars on the condition that he use his own "machine boat" for removing snags. The "machine-boat" was merely a ferry-flat with a windlass and various levers to multiply the power of manual operation. Because Bruce would use only his own

machine for removing snags, and it did appear to be a workable device, he was awarded the \$1000 prize when his bid for removing snags was accepted by the War Department on September 23, 1824.<sup>27</sup>

The contract provided that for the sum of \$60,000, which was \$140,000 less than his nearest competitor, Bruce would remove all snags which impeded navigation in accordance with the Rivers and Harbors Act of 1824. He was to complete the work by January 1, 1827, and submit his work to the inspection of an officer of the Corps of Engineers. One disgruntled competitor commented the Bruce contract was a "leap in the dark" well calculated to "ruin the undertaker, or to impose on government," for no one really knew what the project would entail. Another predicted the contract would not accomplish its goals because "it will require the labour of each *succeeding season*, to repair the injuries done the navigation at each *preceeding* flood, or in other words it will require constant labour and attention . . . ."<sup>28</sup>

Major Samuel Babcock, Corps of Engineers, was selected to inspect performance of the Bruce contract. It was to prove an unfortunate choice; Major Babcock had no experience with river navigation, nor had he ever traveled the Ohio and Mississippi rivers. He supervised construction of Fort Delaware from 1815 to 1824, and had been court-martialed in 1824 for erroneous estimates and faulty construction of the works. The evidence submitted at the hearing proved he was guilty of no wrong-doing but did not indicate a high degree of competence. Only three months after acquittal in the Fort Delaware case, Major Babcock received orders, dated November 16, 1824, from the Chief Engineer to report to Pittsburgh to inspect the work of John Bruce. Babcock was warned that he would "be held



(Chief of Engineers Photograph)  
(Record Group 77, National Archives)

MAJOR GENERAL ALEXANDER MACOMB

Chief, Engineer Corps, 1821-1828

responsible for the faithful execution of such parts of the work as may be comprehended in your certificates, as well as for the correctness of your estimates of the value of work done. The contract, which is presumed to be too clear to require explanation, will be your guide."<sup>29</sup>

On arrival at Pittsburgh, Major Babcock found that John Bruce was constructing machine boats, collecting a work crew, and did not plan to initiate operations till June, 1825. Major Babcock requested a leave until that date, but it was refused. General Macomb explained that the "Western people look with great anxiety towards the accomplishment of the contract, and the Department feels great solicitude that nothing shall be wanting on its part towards carrying into effect the magnificent designs of Congress in this instance."<sup>30</sup>

John Bruce assembled a floating plant of eight skiffs and flatboats and four machine boats and employed a crew of laborers; and on June 30, 1825, with eighteen months left on the contract, he began the project. Major Babcock wrote an extensive description of the Bruce machine boats:

Two [hulls], parallel to each other, and from eight to twelve feet apart, so as to embrace the largest trees; they are connected together by cross timbers, which support a lever of from fourteen to twenty feet in length, the fulcrum of which is two feet from the end; from this depends an iron bar, perforated at short distances; to that is attached a pair of iron claws, shaped like those of a crab. From the end of the lever a rope passes, which leads to a windlass worked by four men. The weight of the largest trees offers but a trifling resistance to this simple machine. To maintain the machine in its place, instead of iron anchors, four upright pieces of wood [spuds] are used which slide up and down in places made for them, at pleasure, at the opposite angles of the machines."<sup>31</sup>

With thirty-two men operating the machine boats and a small additional force

using hand tools, Bruce proposed to clear the entire course of the Ohio River and most of the Mississippi of all snags, estimated by one riverman to number about 50,000, in about eighteen months. Major Babcock drifted along behind the working boats in a large bateau rowed by four men to inspect the work as it progressed down river. Babcock observed that the contractor was removing snags from the low-water channel only and he requested instructions from headquarters. General Macomb replied:

It appears to me impossible to make the 1st Article of that contract, which embraces the points in question, more clear by any attempt at explanation which would be merely a repetition of the language in which that article is couched.

I must again refer you to the contract which admits of but one interpretation.<sup>32</sup>

But the contract was subject to two interpretations. It directed that the work be done in accordance with the provisions of the Act of 1824, which clearly called for the removal of snags from the low-water channel, as had the printed advertisement which asked for bids on the work, while another phrase in the contract provided that all snags "which impede the navigation" will be removed. At high-water stages many more snags than at low-water impeded navigation, and rivermen commonly used different channels at high water than those they navigated at low water. John Bruce doubtless presented Major Babcock with copies of the Act of 1824 and the advertisement, for the Major accepted the *one* interpretation of the contractor.<sup>33</sup>

The project was completed to Wheeling in a short time because Pennsylvania had cleared the low-water channel of that river section a few years before; Bruce was paid one thousand dollars for this first work. In September the work crews reached



Maysville, Kentucky, where a minor incident interrupted operations. Bruce had evidently hired a crew of rough rivermen, for some members of the work force were "made prisoner by some of the citizens of Maysville." Despite this, Major Babcock thought the project was proceeding satisfactorily. He reported on October 3, from Augusta, Kentucky, that steamboats "may now ply in all stages of the water without danger; and keels will, I apprehend, go out of use in a short time."<sup>34</sup>

General Macomb was delighted and urged more frequent reports on the project "as the work in which you are engaged is of great importance, and excites much interest not only in the West, but in this section of the country." But western rivermen were not so pleased, and Congress began to hear from them. Henry Clay received a letter in November, 1825, which castigated both Bruce and Babcock, listed a number of places where the terms of the contract had not been fulfilled, pointed out that the contract had been interpreted to mean only the low-water channel, and urged the removal of Major Babcock, "one who knows nothing of the rivers Ohio and Mississippi, who has never navigated them, who knows not on which side the channel is." The riverman informed Congressman Clay that Major Babcock had accepted work where Bruce had merely trimmed a snag under water and had driven in a stake with a red flag to let boatmen know where it was.<sup>35</sup>

On December 8 angry rivermen dispatched a denunciation of the work to Congress, arguing that it should not have been let to a contractor, "as contractors, generally, consult their own interest, rather than the public good, which, in the present instance, they do not hesitate to say has been the case." Ten days later, steamboat owners, masters, and pilots

confronted John Bruce at Union Hall in Louisville and complained to him personally. Bruce responded that the contract called for removal only of those obstructions in the low-water channel, that Major Babcock concurred with this interpretation of the contract, and that only if Congress provided an additional sum of \$40,000 would he extend the scope of the project. The rivermen of Louisville sent another memorial of objection to Congress and a letter to Major Babcock, urging him to employ a river pilot to assist in locating the obstructions.<sup>36</sup>

Henry Clay had passed the first complaint received along to General Macomb, who immediately ordered Captain William H. Chase, Corps of Engineers, to catch the express stage to Pittsburgh and proceed down the Ohio for inspection. The contract called for clearing the whole river and made no allusion to the channel of the river, said General Macomb:

I can hardly believe Major Babcock or Mr. Bruce could have construed the contract in the manner imputed to them; and particularly the latter, who was present when it was formed, and who, in the course of frequent discussion respecting it, became thoroughly informed of the intention of the Government, that the contract was to provide for the removal of all the trees and other obstructions of that nature, so as to render the navigation of every part of the river safe for a draft of ten feet in all stages of the water, when its depth was sufficient for that draft.<sup>37</sup>

Captain Chase, on his arrival at Wheeling, reported the work accomplished on the uppermost section of the river "exhibits the greatest neglect on the part of the contractor." Chase continued the inspection to Louisville and made similar reports on that section of the river. On December 13, General Macomb informed Bruce that complaints had been received, that an Engineer officer had reported unfavorably on the work done, and that the

contract was therefore suspended pending further investigation. The Chief Engineer suspended Major Babcock from the project, placed him under arrest, and ordered the convening of a court-martial. The Chief also informed Major Stephen H. Long, who was constructing the experimental dam at Henderson at the time, that he was to relieve Major Babcock; he told Long the appointment was made "in the belief that the frequency of your employment on those rivers and the attention you have devoted to the immediate object of the superintendency will have made you familiar with the subject and have rendered you peculiarly qualified for the duty."<sup>38</sup>

On June 7, 1826, a general court-martial met at Cincinnati to try Major Babcock on four charges: 1) disobedience of orders; 2) neglect of duty; 3) making a false certificate; and 4) making a false statement in an official report. The Major answered "Not Guilty" to all charges and a lengthy trial ensued. Many rivermen testified for the prosecution, as did the pilot of the boat on which Major Babcock had descended the river. Witnesses for the defense included John Bruce, some of his employees, and Samuel McKee. On August 1, the court found Major Babcock guilty on all charges and sentenced him to be dismissed from the service. Nevertheless, it recommended executive clemency because of the novel character of the project and the length of service of Major Babcock to the United States.<sup>39</sup>

President John Quincy Adams reviewed the evidence in the case. It clearly indicated the problems which resulted in the court-martial derived from the fact that Major Babcock was not qualified by experience for the post to which he was assigned; that he conducted his duties to the best of his abilities; and that his principal

error was accepting the contract interpretation of the contractor. The President concluded the errors of Major Babcock were not intentional and derived principally from the novelty of the project and the difficulty experienced in distinguishing real from imaginary obstructions in the river. The Chief Executive therefore remitted the sentence and ordered that Major Babcock be retained in the service.<sup>40</sup>

Because the expert services of Major Long were required elsewhere in 1826, the War Department appointed Samuel McKee, the chief competitor of Bruce for the contract, to inspect the work and authorized him to employ assistant inspectors. Operations resumed in the summer of 1826, but progress slowed because McKee signed no certificates of completion unless the river was cleared from bank to bank. Work was further delayed when Samuel McKee died in October. His assistant, John Sowers, served temporarily as inspector, while the War Department searched for a qualified man whose appointment would satisfy navigation interests. On the recommendation of Major Long and others, Captain Henry M. Shreve was appointed on December 10, 1826, as Superintendent of Western River Improvements.<sup>41</sup>

The Chief Engineer informed Captain Shreve the government could terminate the Bruce contract on January 1, 1827, and exact the penalty for nonfulfillment, but did not wish to do so until after Shreve completed a thorough inspection and reported his opinion of the likelihood of Bruce completing the contract satisfactorily. Shreve reported that though Bruce had a number of machine boats under construction at St. Louis and had reached the mouth of the Green River on the Ohio, just above Evansville, Indiana, he had

neither the means nor capability for completion of the contract. The contract was declared forfeited on April 9, 1827, and the Secretary of War directed Captain Shreve to employ hired labor and personally direct continued operations.<sup>42</sup>

At the end of the contract, Bruce had 129 men and 13 machine boats at work; he had been paid \$18,563.93 on the contract for work completed and had received the \$1000 contest prize. Bruce employed an attorney and petitioned Congress for remuneration of losses on the contract — losses caused, he claimed, by the failure of the Corps to furnish adequate inspection of the project. In 1833 the Committee on Claims of the Senate referred the Bruce case to Chief Engineer Charles Gratiot (1828-1838), who re-investigated and reported that Bruce was due no additional compensation, but the Senate Committee thought otherwise. Congress awarded Bruce \$6,240.63 in 1834, but rejected his claim made in 1840 for further compensation.<sup>43</sup>

The Committee on Roads and Canals of the House conducted a thorough investigation of the snag-removal project in 1830. Its astute conclusions were:

The undertaking was new. Persons possessing the requisite practical knowledge of the navigation and the obstructions to the same, of those rivers, could not be, or were not employed at the commencement of the work. The difficulty of removing obstructions which were fastened in the bed of the river, 20, 30, and 40 feet below the surface of the water, was not easily to be overcome. The agency of some machinery, not before in use, for the improvement of our water courses, was deemed indispensable. Much of the time, and a great portion of the money was expended in the necessary experiments, and preparation to commence the work.<sup>44</sup>

### *Summary*

While the contest and contract of 1824 were unproductive of the goals of the first

"Rivers and Harbors Act," the Corps of Engineers learned some important lessons which were to have nationwide application. The snag-machine contest, while it stimulated interest in the project, proved unsatisfactory. The necessary tools and machinery for improving inland waterways could only be developed by men with knowledge of the special problems of river navigation and extensive on-the-job experience. Operations under the Bruce contract demonstrated there were no "prompt and effectual" methods to immediately improve the rivers for free and safe navigation; instead, the improvement of inland rivers would have to be a continuing effort in order to be effective. The Bruce contract also revealed that work on the rivers was so variable that producing results by means of the contract system would be impossible until methods of improvement were developed which would permit the establishment of firm contract specifications and standard evaluation procedures. And, finally, anyone assigned to supervise and inspect navigation improvement projects should first be thoroughly familiar with waterways navigation and improvement methods.

The impact of these lessons was reflected in the act of March 3, 1827, the first of a series of annual appropriations for the Ohio River, which directed that obstructions of "every description" which endangered navigation at "any navigable stages" and on the banks and sides of the river were to be removed. It also directed that "some practical agent" thoroughly acquainted with the navigation of the Ohio River be placed in charge of the project.<sup>45</sup>

Under the capable direction of the "practical agent," Captain Henry M. Shreve, from offices at Louisville, Ken-

tucky, the improvement of navigation on the Ohio and Mississippi rivers proceeded in 1827. Captain Shreve extended improvement operations, as directed by Congress, to the Missouri, Arkansas,

Cumberland, Red, and other rivers during the following decade and developed the machinery and methods necessary to accomplish the task, with immense benefit to the navigation of the inland waterways.